

PEER REVIEWS AND INTERNATIONAL ASSURANCES

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I. Peer Reviews and International Assurances

“In an effective global system for securing nuclear materials, words alone are not enough to give states confidence in one another’s security practices. States must instead take steps to build the confidence of others in their activity and be held accountable for their commitments, while protecting sensitive information.”¹

Building confidence in one another’s security practices and being held accountable for one’s commitments—this quote captures the objectives of peer reviews and international assurances as they pertain to nuclear security. The 2014 Nuclear Security Summit (NSS) Communiqué refers to states taking action to “show that they have established effective security of their nuclear materials and facilities while protecting sensitive information . . . thereby building national and international confidence in the effectiveness of their nuclear security regimes”—another way of framing those objectives.² The most recent International Atomic Energy Agency (IAEA) General Conference Nuclear Security Resolution acknowledged in preambular paragraph (k) that nuclear security may “contribute to the positive perception, at a national level, of peaceful nuclear activities.”³

There does not appear to be a commonly used definition of the term “peer review” in the nuclear energy sector.⁴ This is because a peer review is a mechanism or methodology for obtaining information deemed pertinent to the evaluation of performance effectiveness. Methodologies are adapted and tailored to the objectives. In nuclear security, the objectives are as mentioned previously.

Concerning “international assurances,” these too are imprecise in definition. An assurance could be the confidence that one feels that another’s activities are benign or are honorable (as in implementing legally or politically binding commitments). Assurance can also be the means by which confidence can be obtained (for example, through the kind of activities undertaken and the quality of information received about the activities). The latter meaning will be used in this paper.

Enhancing assurances can therefore refer to (a) the measures being implemented; (b) the way in which the measures are being implemented; (c) the provision of information about the measures and their implementation; and (d) the quality of the information such that it is accepted as an assurance.

The 2014 NSS Communiqué includes the following voluntary measures: “publishing information about national laws, regulations and organization structures; exchanging good practices; inviting IAEA review

and advisory services and other reviews and following up on their conclusions; providing information through relevant existing reporting mechanisms and forum; further developing training of personnel involved in nuclear security by setting up and stimulating participation in training course and applying domestic certification schemes.” Such measures “build national and international confidence in the effectiveness of their nuclear security regimes.”⁵

However, none of the listed measures are mandatory. The reality is that peer reviews aimed at assessing and promoting “effective nuclear security regimes” are voluntary. The 2020 IAEA International Conference on Nuclear Security (ICONS) Ministerial Declaration encouraged “Member States to use and contribute to the IAEA’s nuclear security advisory services and peer reviews, on a voluntary basis.”⁶ Reinforcement of the voluntary, non-obligatory nature of peer reviews came most recently in the 2020 IAEA General Conference Nuclear Security Resolution.⁷

Against this backdrop, some questions arise:

- What kind of information is sufficient (or acceptable) to build confidence in a state’s nuclear security system?
- Do existing peer review procedures provide a basic level of confidence about a country’s nuclear security? Can they be strengthened?
- Do the peer review and advisory services obtain the information needed for generating confidence?⁸ What kind of information?
- Is there a means to ensure “continuous improvement” in a host state’s nuclear security practices?⁹
- Can non-sensitive, sharable information obtained through peer reviews build confidence?¹⁰
- When states see other states voluntarily accepting peer reviews and follow-up actions, does that provide encouragement to do the same?¹¹

II. Comparison of Peer Review

The table below summarizes various types of information sharing and peer review mechanisms, including organizations relevant to those mechanisms.

Mechanism	Key Elements and Constraints
<p>International Physical Protection Advisory Service (IPPAS)</p>	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> • IPPAS missions are conducted by an international team of experts whose composition is agreed by host country in advance. • IPPAS missions are an advisory service, not a peer review <i>per se</i>. • They provide advice, identify good practices, and suggest improvements to the host country’s nuclear security regime. <p><u>Objectives:</u></p> <ul style="list-style-type: none"> • They are designed to:

	<ul style="list-style-type: none"> ○ Review/compare a state’s physical protection regime and its security systems for nuclear and other radioactive material and associated facilities and activities against international legal instruments and the IAEA Nuclear Security Series (NSS); ○ Assist Member States and operators to implement requirements and recommendations from international instruments and NSS publications; and ○ Identify good practices that could be (anonymously) communicated to other Member States for long-term improvement.¹² <ul style="list-style-type: none"> ● IPPAS missions also: <ul style="list-style-type: none"> ● Provide a “basis for development of a comprehensive program to enhance nuclear security at the State and facility levels;” ● Promote sustainability and nuclear security culture; ● Promote implementation of NSS guidance and the amended CPPNM; ● “Promote the identification, in the course of the mission, of good practices that could be communicated to other Members States for long term improvement;”¹³ and ● Help to “build confidence within the international community and the general public with regard to the effectiveness of national nuclear security regimes.”¹⁴ ● These are “not a regulatory inspection or an audit against set codes and standards. Rather, these are assessments of the existing practices of a country, in the light of relevant international instruments and IAEA nuclear security publications, and an exchange of experience and accepted international practice aimed at strengthening the security organization and the procedures and practices being followed.”¹⁵ <p><u>Scope:</u></p> <ul style="list-style-type: none"> ● There are five modules/review areas among which the host country can select:¹⁶ <ul style="list-style-type: none"> ○ national nuclear security regime for nuclear materials and facilities; ○ nuclear facility review; ○ transport review; ○ security of radioactive material and associated facilities and activities; ○ information and computer security review.¹⁷ <p><u>Outcomes:</u></p> <ul style="list-style-type: none"> ● The IPPAS mission can result in three possible outcomes:
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	<ul style="list-style-type: none"> ○ <u>Recommendation</u>: advice on improvements that should be made in areas evaluated and discussed with host; ○ <u>Suggestion</u>: proposal made in conjunction with recommendation or as stand-alone item; ○ <u>Good practice</u>: outstanding program or performance that goes beyond international obligations and IAEA recommendations.¹⁸ <p><u>Constraints</u>:</p> <ul style="list-style-type: none"> ● Follow-up activities are not mandatory and only at the request of the host country.¹⁹ ● IPPAS reports are not published without approval of the host country.
<p>Convention on Nuclear Safety (CNS)</p>	<p><u>How It Works</u>:</p> <ul style="list-style-type: none"> ● CNS Contracting Parties agreed at the 2017 Review Conference to release their respective country reports. ● Each Contracting Party prepares and submits a national report “on the measures it has taken to implement” the obligations of the Convention. ● Other Contracting Parties review and submit questions. ● National reports are discussed at the Review Conferences in Country Groups, which then issues a Country Review Report. <p><u>Constraints</u>:</p> <ul style="list-style-type: none"> ● However, CNS peer reviews have restrictions: <ul style="list-style-type: none"> ▪ There are no in-country visits, audits, evaluations, or inspections. ▪ The host country must approve its own CNS country report (i.e., adopted by consensus). ● The Final Summary of the CNS Review Conference does not name countries (although if a country has not submitted a national report to the Review Conference, it is named in the Summary).
<p>Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste</p>	<p><u>How It Works</u>:</p> <ul style="list-style-type: none"> ● Joint Convention peer reviews are modelled after CNS reviews. ● Contracting Parties submit national reports (effectively self-assessments), which are reviewed at periodic review meetings. ● There are no in-country visits or a specialized peer review team. ● Countries submit “good practices, suggestions, challenges” in their respective national reports at least three months before a review meeting.

	<ul style="list-style-type: none"> National reports are discussed at the review conference; a rapporteur prepares report agreed by all “Country Group” members. <p><u>Constraints:</u></p> <ul style="list-style-type: none"> Rapporteur reports are not made public. The only document made public is prepared by the Review Meeting President “summarizing major issues.” No countries are identified by name.
<p>Operational Safety Review Team (OSART)</p>	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> Has a weaker peer review process than Institute of Nuclear Power Operations (INPO) or World Association of Nuclear Operators (WANO) industry review.²⁰ Assessments are against IAEA nuclear safety standards (see below for differences between OSART and WANO reviews). The purpose of these missions is to strengthening procedures and practices at operational plants. They provide the host with an objective assessment of power plant safety.²¹ Performance assessments are based on IAEA safety standards. They are not a regulatory inspection or an audit against national codes and standards. The reviews provide the host country with recommendations and suggestions on improvements needed to meet IAEA standards. They also provide “recognition” to the host country for self-identified issues and for implementation of actions to close gaps. <p><u>Constraints:</u></p> <ul style="list-style-type: none"> The scope of the mission and reviews are defined and agreed with the host country. OSART lacks rigorous training for team leaders. OSART peer reviews do not gain access to operating conditions of plant. Reports are made public, but thorny issues of gaps and deficiencies are redacted.
<p>IAEA Peer Review and Advisory Services Committee (PRASC)</p>	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> PRASC focuses on: <ul style="list-style-type: none"> Improving training and selection of experts for missions; developing “joint scope safety and security;” and Implementing new advisory mission on regulatory infrastructure for radiation safety and nuclear security (RISS).²²

	<ul style="list-style-type: none"> • PRASC publishes a mission calendar of planned and completed peer review and advisory service missions, along with mission reports and summaries. • Improvements that are currently underway include: <ul style="list-style-type: none"> ○ An update of the IPPAS Good Practice Database (accessible to Global Nuclear Safety and Security Network participants); ○ Guidance on IPPAS self-assessments (due for publication in 2021); ○ Development of new IPPAS modules; and ○ Updated materials for international and national IPPAS workshops.²³ • PRASC functions also include to: “define performance indicators to assess [existing services’] efficiency and effectiveness, to review the lessons learned, and to advise on any proposed new type of peer review or advisory service.”²⁴ • PRASC has produced an “enhanced structure of services” clarifying categories of review services: Generic Peer Reviews; Specific Peer Reviews; and Advisory Services.²⁵ <ul style="list-style-type: none"> ○ IPPAS and International Nuclear Security Advisory Service (INSServ) are “advisory services,” and are not defined as peer reviews by the IAEA. ○ OSART and Integrated Regulatory Review Services (IRRS) are “generic peer review services.” ○ “Specific peer review services” include PROSPER (Peer Review of Operational Safety Performance Experience). • All three review categories use “recommendations,” “suggestions,” and “good practices” in their respective assessments.²⁶
IAEA Global Nuclear Safety and Security Network (GNSSN)	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> • This is an IAEA-based group dealing with conveying information about peer reviews and nuclear security.²⁷ • Experience and best practices from missions are shared through international seminars. • A Steering Committee identifies areas of interest and Member State requests relevant to peer reviews. For example: “Member States are requesting the IAEA Secretariat to consider analyzing/integrating capacity-building elements into peer reviews and services and to further develop resources for capacity building self-assessment.” • At the International Conference on Effective Nuclear Regulatory Systems, Member States sought to discuss how to “improve the interface between nuclear safety and nuclear security” and to strengthen IAEA peer review services.²⁸

Institute of Nuclear Power Operations (INPO)	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> • Established following recommendations of the Three Mile Island Commission. • First introduced peer reviews in the 1970s • INPO has strictest industry peer reviews, but these are confined to U.S.-based nuclear power plants. • The goal is to have effective peer reviews with follow-up expectations and accountabilities to correct deficiencies and to seek “continuous improvement” leading to excellence. • INPO has strong peer-to-peer accountability, with a focus on continuous improvement and fostering a nuclear safety culture.²⁹ • CEOs have accepted the authority of INPO.
World Association of Nuclear Operators (WANO)	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> • Uses a version of INPO’s peer review approach.³⁰ • Reviews organizational effectiveness (i.e., maintenance operations) based on Performance Objectives and Criteria – a 100+ page guidebook on operating plants. • Peer reviews use the “Corrective Action Data Base” (CADB) to spot trends and recognize problems. • Peer reviews are led by qualified, experienced leaders with first-hand knowledge of operational excellence. • Team members look for trends across various performances areas, utilizing comparisons with other INPO power plants. • Plant performance is graded on a scale of 1-5 (with 1 being highest score), then combined into overall rating for the plant. • If given a rating of 4 (grave problems short of shutdown), WANO provides assistance to help improve performance. • Peer review reports go to plant management (including CEO and Board of Directors). • Reports go to regulator (the Nuclear Regulatory Commission in the United States; the Canada Nuclear Safety Commission in Canada). • In the rest of world WANO applies a 1-4 numerical rating; reporting to the regulator is optional for host country.
CANDU Owners Group (COG)	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> • COG acts as a peer group. • Limited to countries with CANDU heavy-water moderated power reactors.

	<ul style="list-style-type: none"> • A condition of membership is that members must report detailed operational experience (OPEX) and performance issues (e.g., loss-of-coolant or pressure tube weaknesses) to the group in a timely manner, as this could have ramifications for others with CANDU technology. • There is a new working group on nuclear security, with focus on CANDU operating plants and on advanced and small reactors (SMRs). • All reporting is kept confidential. • COG has internal working groups on safety culture, human performance, and self-assessment. • These effectively become peer groups, as participants come from various CANDU technology countries to address specific OPEX issues.³¹ • Sharing of experience and problem solving becomes the basis of a common safety culture. <p><u>Constraints:</u></p> <ul style="list-style-type: none"> • All reporting is kept confidential.
<p>UN Convention Against Corruption (UNCAC)</p>	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> • Uses a unique “implementation review mechanism” (IRM) approved at the 2010 Conference of States Parties.³² • The peer review system is regarded as a significant component of IRM as a means by which States Parties gain confidence that UNCAC provisions and obligations are effectively being implemented. • Some countries proposed robust mandatory peer review system, supported by civil society, with all reports made public. However, other countries successfully negotiated restrictions on scope, effectiveness, and transparency. • All States Parties must host a peer review at some time. • Peer reviews are conducted based on a complex system of regional groupings. There are complex procedures to establish order and frequency of peer reviews per region. <p><u>Constraints:</u></p> <ul style="list-style-type: none"> • Civil society has no role in IRM and peer reviews. • The peer review team composition and team report must be agreed by host country. • The report is not published or disseminated without host approval.

<p>UN Convention Against Transnational Organized Crime (UNTOC)</p>	<p><u>How It Works:</u></p> <ul style="list-style-type: none"> • The IRM was negotiated and agreed at the 2018 Conference of States Parties. • The IRM has a peer review component similar to UNCAC, though it is not yet fully in operation. • UNTOC covers three protocols (each with varying composition of States Parties), which makes selecting peer review teams complex. • An elaborate random draw process is used for identifying peer reviewers. <p><u>Constraints:</u></p> <ul style="list-style-type: none"> • The host country has option to reject reviewers. • There is no recognized role for civil society in the peer review process. • Only executive summaries of the review are made public, but the host country can voluntarily release the complete review. • Elements of the review mechanism’s operation are still under discussion.³³
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III. Peer Reviews to Enhance International Assurances: Four Broad Themes

Peer reviews can enhance international assurances if they reflect the four following areas, all of which can be strengthened in several ways, as described below.

Take Actions to Demonstrate Commitment

- *Demonstrate commitment to implement the IAEA’s Nuclear Security Series documents.*³⁴ The “Joint Statement on Strengthening Nuclear Security Implementation,” put forward at the 2014 Nuclear Security Summit by the Netherlands, South Korea, and the United States, is available for all IAEA Member States to subscribe through IAEA INFCIRC/869.³⁵ Continued and renewed diplomatic effort could be undertaken to persuade additional countries to subscribe to INFCIRC/869. A related effort would aim to include peer reviews in any revision of INFCIRC/225/Rev.5, the implementation of which is a key component of INFCIRC/869.³⁶
- *Self-assessment and the implementation checklist.* Self-assessments, along with the implementation checklist set out in INFCIRC/869, should become standard practice and be conducted regularly. States could commit to hosting periodic reviews based on their self-assessment as a means of identifying weaknesses in their nuclear security systems.
- *Regular IPPAS missions and follow-up.*³⁷ Hosting IPPAS missions to review the effective implementation of nuclear security measures provides significant confidence in a country’s nuclear security practices. Countries could make commitments to accept international reviews and follow-up missions (e.g., IPPAS, INSServ) on a regular basis (e.g., every five years). A strong

demonstration effect would be created by countries that voluntarily accept a follow-on review to address “recommendations” and “suggestions” from the initial report, as they would be illustrating “continuous improvement.” Doing so might encourage other countries to host peer reviews.

Improve Effectiveness of Peer Review Instruments

- *Make the Advisory Services more robust.* Other types of peer review can provide ideas on improving or expanding the scope—including modules—and rigour of IPPAS and INSServ missions. WANO and INPO are examples of good practices, including being grounded in the norm of “continuous improvement,” being based on a strong culture of self-assessments, having consistent follow-up reviews, and requiring reports to highlight discrepancies and gaps while identifying “areas for improvement.” While IPPAS and INSServ missions have some of those characteristics, making those characteristics central to any advisory mission would strengthen these reviews significantly.
- *Engage operators and industry more effectively.* Strengthening the scope of peer review mission modules and guidelines could include greater engagement with operators and industry, rather than just focusing on government actions. For example, the scope of radiological source security reviews should include reviewing the governance structure (role and responsibilities) for radiological source users; security arrangements; implementation of security measures; attitudes toward security in the organization (i.e., “security culture”); and required skills and competencies.³⁸
- *Concepts and procedures from other IAEA groups and services.* Information and data sharing procedures in other types of IAEA peer reviews might be relevant to enhancing confidence building on nuclear security.³⁹ For example, safety peer review missions might yield information on how a state is performing on its nuclear security commitments. The International Nuclear Safety Group (INSAG) and the IAEA Advisory Committee on Nuclear Security (AdSec) are looking at bridging the safety and security “interface” (mentioned in the ICONS Ministerial Statement and the two most recent IAEA General Conference Nuclear Security Resolutions). National initiatives might provide information pertinent to a state’s national security regime—e.g., the United States-led International Nuclear Materials Protection and Cooperation (INMPC) program. International regulator groups could offer a means of enhancing effective implementation of nuclear security commitments by requiring or encouraging peer review.

Build Strong Norms and Security Culture

- *Norm building to underpin implementation and compliance.*⁴⁰ IAEA Director General Rafael Grossi said at the 2020 ICONS that nuclear security should be a norm. Development of norms and standards can occur in tandem with strengthening implementation of commitments and can assist in eventually moving toward the development of binding standards. (Some experts see this development as a necessary step toward an international treaty on nuclear security, though it is unclear what relationship such a treaty would have to the CPPNM/A.)⁴¹ Elevating the Nuclear Security Series from guidance to standards would also increase the expectation that all states

would establish nuclear security regimes in line with those documents. IPPAS reviews would incorporate these standards.⁴²

- *Strengthen security culture.*⁴³ Indicators of good security culture should be included in peer reviews, which should include a methodology for helping states evaluate their own nuclear security culture through a national self-assessment process. A compilation of “good practices” in nuclear security culture could encourage countries to improve this aspect of their national practices. A strong security culture helps to build “demonstrable competence of management and personnel with accountability for nuclear security.”⁴⁴ In addition, members of peer review teams could be required to undertake nuclear security management certification programs as a means of giving heft to a peer review’s security culture objectives. Nuclear Security Support Centres (NSSCs) could help to train and raise the competence of peer reviewers, given that IPPAS and INSServ reviewing teams are staffed by Member States.

Expand Transparency, Information-Sharing, and Information Gathering

- *Communicate confidence-building information.* Best practices, including possible vehicles, for communicating information relevant to nuclear security implementation could be examined and strengthened. Developing best practices could include identifying pertinent information useful for confidence building while protecting sensitive information. Broad, non-sensitive data from IAEA peer reviews and advisory missions could be shared on the Nuclear Security Portal (NUSEC). This information should be more than a compilation of “good practices” if the NUSEC participating states are to derive confidence about a country’s implementation of NSS guidelines and recommendations. States could also use amended Convention on the Physical Protection of Nuclear Material (CPPNM/A) Article 14 submissions on laws and regulations that give effect to the convention to share more comprehensive information on their nuclear security regime. Other entities, such as NSSCs and Centers of Excellence, could serve as examples of, or vehicles for, national or regional information-sharing practices.
- *Information from other nuclear security entities.*⁴⁵ Requirements and procedures of other organizations in the global nuclear security architecture, including those with informal information exchanges, such as the Global Initiative to Combat Nuclear Terrorism (GICNT) and the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (Global Partnership)—could yield useful information on effective implementation of commitments and valuable confidence-building information. Information submitted under United Nations Security Council Resolution 1540 offers another vehicle for countries to provide information on their nuclear security laws, regulations, and practices. Regulatory and regional organizations, such as the European Nuclear Security Regulators Association and Euratom, could also be a source of information on nuclear security practices. Initiatives from civil society, like the NTI Nuclear Security Index, provide another source of information to build confidence in national nuclear security regimes.
- *Information from nuclear industry.* Public annual reporting by a company or agency utilizing nuclear and radioactive technologies and materials should contain assurances or formal security accountability statements. Such a program “requires openness regarding peer review,

accountability mechanisms for all stakeholders, and actions that demonstrate effectiveness, as well as a cultural commitment to acknowledging and correcting weaknesses.”

- *Procedures from safety or safeguards assessments of compliance.* NSS 13 recognizes the importance of Nuclear Material Accountancy and Control (NMAC) for nuclear security dealing with insider threats.⁴⁶ Procedures from safeguards and safety compliance could provide insights with respect to nuclear security on materials and related information. The IAEA recently launched COMPASS (IAEA Comprehensive Capacity-Building Initiative for SSACs and SRAs) to help states strengthen the effectiveness of their national authority responsible for safeguards implementation (SRA) and their system of accounting for and control of nuclear material (SSAC), thus improving both safeguards and security.⁴⁷

IV. Conclusion

Information sharing and peer review build confidence in countries’ nuclear security and can strengthen implementation of nuclear security through sharing best practices, identifying areas for improvement, and promoting actions to improve. Nuclear security information sharing can be done on a private bilateral or multilateral basis to help build up best practices, share lessons learned, and identify areas of possible engagement, but also can be shared more broadly to build public confidence in the peaceful use of nuclear technology. The most effective components from other information sharing and peer review mechanisms—whether from existing nuclear security mechanisms, mechanisms outside the field of nuclear security, non-nuclear organizations, or elsewhere—can be instructive in strengthening information sharing and confidence building in the area of nuclear security.

ANNEX: TWO CASE STUDIES ON PEER REVIEW

The IPPAS Mission to Canada in 2015⁴⁸

In 2015, Canada was one of the first countries to request a mission to include all five IPPAS modules. Canada also was one of the first countries to take the voluntary national step of publishing the IAEA's report online. Although it cannot be found on the IAEA website, the whole report is publicly available on the website of the Canadian Nuclear Safety Commission (the regulator). Some of the issues assessed and addressed in the review relate to the interface between nuclear security and nuclear material accountancy and control. A total of 3 Recommendations and 30 Suggestions were provided by the IPPAS team, and a total of 21 Good Practices were identified.

It is worth looking at the IPPAS report to understand the approach taken by the reviewing team. The approach taken in the five modules, in accordance to IPPAS Mission Guidelines, elicited information that is confidence building in nature, but could be reviewed to see how it be improved or tailored differently for States that are more reticent than Canada in providing information, access, and transparency to the reviewers.⁴⁹

WINS Report on Security in Civil Nuclear and Aviation Sectors (February 2020)

In an extensive study, WINS examined and compared the civil nuclear and aviation sectors to identify “transferable best practices” in the area of security.⁵⁰ In comparing the International Civil Aviation Organization (ICAO) and the IAEA, WINS summarized the “deficiencies” of the current IAEA nuclear security regime, among them: (a) there are no security standards against which to assess compliance; (b) no activities are mandatory; (c) the IAEA does not publish any consolidated information about IPPAS mission results, nor any summarized data to highlight trends in nuclear security implementation; (d) there is no mechanism for the IAEA to identify or help resolve significant nuclear security deficiencies or concerns; (e) the IAEA has no authority over Nuclear Security Support Centres (NSSCs) in Member States nor does it define any training requirements; and (f) the IAEA does not require any of its IPPAS reviewers or trainers to be certified.⁵¹

Both the IAEA and ICAO use a self-assessment questionnaire to identify where additional support is required by the State. However, ICAO uses results of mandatory aviation security audits, whereas the IAEA has to rely on voluntary engagement of Member States in every aspect of the nuclear security regime.

WINS makes the following recommendations: an international framework of minimum security norms needs to be developed by the IAEA and applied in States; audits should be conducted to identify the level of implementation and any gaps or deficiencies; with agreement of the State, details of audits are to be provided to other Member States that have committed to providing funding to help address performance gaps; a State should then receive a specific program of support; and performance data, “suitably presented to avoid issues of confidentiality,” will be made available to all Members States to show how to implement continuous improvements to the global nuclear security program.⁵²

¹ “Global Dialogue on Nuclear Security Priorities: Building an Effective Nuclear Security System”, NTI Paper 2016, p.14.

² The Hague Nuclear Security Summit Communiqué, March 2014, paragraph 20.

³ See also the IAEA Director General’s Nuclear Security Report 2020, GOV/2020/31-GC(64)6. According to the 2020 Report, a total of 84 INSSPs have been approved to date. Since 1996, a total 90 IPPAS missions have taken place in 54 Member States (to end 2019).

⁴ There are definitions, but they are admittedly contextually influenced. See, for example, “The UK Nuclear Industry Guide to Peer Review of Safety Cases”, Nuclear Industry Safety Directors’ Forum, August 2016, where peer review is “an examination or review of commercial, professional or academic efficiency, competence, etc. by others in the same occupation”. But then: In the context of nuclear safety case submissions, there are a variety of definition in the industry, for example ‘Peer Review is an independent review of the quality and accuracy of safety related decisions and activities to ensure they have been adequately justified’.”

⁵ The Hague Nuclear Security Summit Communiqué, op.cit., paragraph 20.

⁶ Ministerial Declaration, International Conference on Nuclear Security: Sustaining and Strengthening Efforts, 10-14 February 2020, Vienna, paragraph 16. For a summary of the ICONS Ministerial Meeting (February 2020), see Jessica Bufford, “Nuclear Security: The IAEA Faces the Future”, Arms Control Today, May 2020.

⁷ Nuclear Security Resolution, IAEA 64th General Conference, September 2020, operative paragraph 14

⁸ Greg Rzentkowski believes the questions asked in self-assessments and in peer reviews might be the best – and most achievable – way of delivering assurance. He suggests focusing on one key performance indicator for each of the 5 IPPAS Modules – i.e. technical areas of importance – and evaluate those results on a risk-informed basis. This he suggests would provide meaningful information whether action/attention would be needed to address a gaps or deficiency in a given country. (Interview with author)

⁹ See Matthew Bunn, Amb. Laura S.H. Holgate, Dmitry Kovchegin, Nickolas Roth and William H. Tobey. “IAEA Nuclear Security Recommendations (INFCIRC/225): The Next Generation.” Paper, Institute for Nuclear Materials Management, July 2020.

¹⁰ See Bart Dal, Jonathan Herbach and Kenneth N. Luongo, “The Strengthening Nuclear Security Implementation Initiative: Evolution, Status and Next Steps”, NSGEG (Nuclear Security Governance Experts Group), October 2015.

¹¹ Raoul Awad considers the Global Initiative to Combat Nuclear Terrorism (GICNT) may offer another path towards international assurances on nuclear security implementation because it is a coalition of the willing, very effective due to being voluntary, involves both the USA and Russia, and deals, inter alia, with capacity building and international cooperation. (Interview with author.) See: “The Work of the GICNT from the 2017 Tokyo Plenary to the 2019 Buenos Aires Plenary”. http://www.gicnt.org/documents/GICNT%20Plenary%20brochure_2019.pdf

¹² See “International Physical Protection Advisory Services (IPPAS),” Kristof Horvath, Senior Nuclear Security Officer, Nuclear Security Division, Department of Nuclear Safety and Security.

¹³ Ibid. It should be noted that the IPPAS Guidelines currently in use were developed in the context of INFCIRC/225/Rev.5 and before the amended Convention on the Physical Protection of Nuclear Material (CPPNM/A) came into force. This provides, as some authors have pointed out, a *prima facie* reason to recommend updating INFCIRC/225 and extending the scope of review mission guidelines to take into account the newly extended scope of CPPNM/A. See Matthew Bunn, Amb. Laura S.H. Holgate, Dmitry Kovchegin, Nickolas Roth and William H. Tobey. “IAEA Nuclear Security Recommendations (INFCIRC/225): The Next Generation.” Paper, Institute for Nuclear Materials Management, July 2020.

¹⁴ Ibid.

¹⁵ International Physical Protection Advisory Service (IPPAS) Guidelines, Services Series 29, Vienna, November 2014, p.3. Further: “The IPPAS team reviews the processes for evaluating effectiveness of a facility or transport physical protection system and, where necessary, makes recommendations and/or suggestions to improve these processes. An IPPAS team may not have either the time or access to the necessary sensitive information (e.g. design basis threat, barrier delay/response times) to allow it to assess the effectiveness of a facility or transport physical protection system.” Ibid. (emphasis in the original)

¹⁶ The guidance provided in the five Modules can be used for “self-assessment purposes” for those countries not ready or willing to host a full IPPAS mission. Such self-assessment would provide the Secretariat with information on the country’s level of effective implementation in its national nuclear security regime. The information could

help to enhance confidence if shared with other Member States via the Nuclear Security Portal – but only if the country would authorize it.

¹⁷ Ibid., p.19. The Mission Guidelines note that Module 1 – “National Review of Nuclear Security Regime for Nuclear Material and Nuclear Facilities” – is “the recommended starting point for host countries that wish to have their physical protection regime reviewed against international instrument and guidance”.

¹⁸ “Good Practice” is the only part of an IPPAS report that could see the light of day, depending on authorization by the host country. If so authorized, this information can be collected by the Secretariat and distributed only to those IAEA Member States participating in the Global Nuclear Safety and Security Network (GNSSN).

¹⁹ However, initiating a follow-up provides an opportunity for the host country, in consultation with the Agency, to identify assistance needed in implementing the IPPAS Mission’s recommendations and suggestions. Assistance can be provided by the Agency or through bilateral support programs. Note that bilateral assistance programs to help implement IPPAS recommendations and suggestions may be a means by which the donor Member State can get a glimpse into the effectiveness of the national nuclear security system.

²⁰ OSART Guidelines, 2015 Edition, IAEA Service Series 12 (Rev.1), Vienna, February 2016

²¹ OSART Guidelines, 2015 Edition. Reference Report for IAEA Operational Safety Review Teams”, IAEA Service Series No.12 (Rev.1).

²² “Overview of Structure of Services offered by the Department of Nuclear Safety and Security (NS)”, Shahid Mallick, Head, Program and Strategy Coordination Section, Office of Nuclear Safety and Security Cooperation, Department of Nuclear Safety and Security.

²³ See “The Peer Review and Advisory Services Committee (PRASC) and its Work”, Gustavo Caruso, Director, Office of Nuclear Safety and Security Coordination, Department of Nuclear Safety and Security, 29-30 June 2020.

²⁴ PRASC was also responding to the previous year’s General Conference Resolution on Nuclear Security – namely Operative Paragraph 45 of GC (63)/RES/7: “Requests the Secretariat to continue to provide for and promote the regular interaction of the Peer Review and Advisory Services Committee with Member States and, in close consultation and coordination with Member States, continues to assess and strengthen the overall structure, effectiveness and efficiency of services within the purview of the Committee, and to report to the Board of Governors on the outcomes of this common effort.”

²⁵ See the Peer Review and Advisory Services Committee (PRASC), Virtual Technical Meeting on the “Peer Review and Advisory Services in the Areas of Nuclear Safety and Security”, 29-30 June 2020. Video-recorded presentations can be found at: https://gnssn.iaea.org/main/Pages/PRASCTechnical-Meeting_2020.aspx.

²⁶ See the Peer Review and Advisory Services Committee (PRASC), Virtual Technical Meeting on the “Peer Review and Advisory Services in the Areas of Nuclear Safety and Security”, 29-30 June 2020. Video-recorded presentations can be found at: https://gnssn.iaea.org/main/Pages/PRASCTechnical-Meeting_2020.aspx

²⁷ According to the Secretariat: “GNSSN is both a human network and a web platform, allowing its members to share nuclear safety and security knowledge services to further the goal of achieving worldwide implementation of a high level of nuclear safety and security. It promotes activities, including capacity building programmes and peer review missions, such as the International Protection Advisory Service (IPPAS) and the Integrated Regulatory Review Service Missions (IRRS).” The GNSSN was established in 2007.

²⁸ Shahid Mallick brief to the 8th Steering Committee of the GNSSN on the outcomes of the “International Conference on Effective Nuclear Regulatory Systems: Sustaining Improvement Globally”, Vienna, 11-15 April 2016.

²⁹ See “Staying on Top: Advancing a Culture of Continuous Improvement”, Institute of Nuclear Power Operations, INPO 19-003, August 2019; “Nuclear safety Culture: Industry Best Practices”, INPO 20-004, August 2020.

³⁰ See, for example, “INPO and WANO-AC Manual for Conducting Plant Evaluations and Peer Reviews”, INPO Revision 12, February 2020.

³¹ CANDU technology countries (i.e. COG members) include Canada, Romania, South Korea, China, Argentina, India, Pakistan.

³² See “Mechanism for the Review of the Implementation of the United Nations Convention Against Corruption – Basic Documents” https://www.unodc.org/documents/treaties/UNCAC/Publications/ReviewMechanism-BasicDocuments/Mechanism_for_the_Review_of_Implementation_-_Basic_Documents_-_E.pdf See also: <https://www.unodc.org/unodc/en/corruption/implementation-review-mechanism.html>

³³ See “Outline of the Mechanism for the Review of Implementation of the United Nations Convention Against Transnational Organized Crime and the Protocols Thereto”.

https://www.unodc.org/documents/treaties/UNTOC/Review%20Mechanism/PPTreview_mechanism2.pdf

See also <https://www.unodc.org/unodc/en/organized-crime/intro/review-mechanism-untoc.html>

³⁴ See, in particular, “Objective and Essential Elements of a State’s Nuclear Security System”, IAEA Nuclear Security Series (NSS) 20.

³⁵ See: “Strengthening Nuclear Security Implementation”, Nuclear Security Summit, The Hague, 2014. The initiative became the basis of INFCIRC/869, October 2014. Two-thirds of the 53 participating states signed on to the initiative at the Summit.

³⁶ See Matthew Bunn et al, op.cit.

³⁷ The “Strengthening Nuclear Security Implementation” initiative became the basis of INFCIRC/869 (October 2014).

³⁸ WINS

³⁹ Generic Peer Review Services include: ARTEMIS (Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation); EPREV (Emergency Preparedness Review); INSARR (Integrated Safety Assessment of Research Reactors); IRRS (Integrated Regulatory Review Service); OSART (Operational Safety Review Service); SCCIP (Safety Culture Continuous Improvement Process); SEDO (Safety Evaluation of Fuel Cycle Facilities during Operation); SEED (Site and External Events Design Review Service); TSR (Technical Safety Review). Specific Peer Review Services include: EduTa (Education and Training Appraisal); ISCA (Independent Safety Culture Assessment); ORPAS (Occupational Radiation Protection Appraisal Service); PROSPER (Peer Review of Operational Safety Performance Experience); SALTO (Safety Aspects of Long Term Operation). Advisory Services include: AMRAS (Advisory Mission for Regulatory Infrastructure for Radiation Safety); INSServ (International Nuclear Security Advisory Service); and IPPAS (International Physical Protection Advisory Service).

⁴⁰ Could this move towards a comprehensive set of obligations be modeled on the “Code of Conduct on the Safety and Security of Radioactive Sources” and its associated “Import/Export Guidance” (which over 126 countries have signed)?

⁴¹ Bart Dal et al, op.cit.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Ibid.

⁴⁶ See also NSS 25-G: “Use of Nuclear Material Accountancy and Control for Nuclear Security Purposes at Facilities”.

⁴⁷ See slide presentation by Agency. COMPASS also offers state-specific support in national training, software and equipment, legal and regulatory areas, and human resources.

⁴⁸ See “IPPAS Mission Report – Canada: 19-30 October 2015”.

<http://www.nuclearsafety.gc.ca/eng/pdfs/IPPAS/Canadas-IPPAS-Mission-Report-2015-eng.pdf>

⁴⁹ In the IPPAS Report, the CNSC noted the following: “While the CNSC is committed to transparency, portions of the report have been redacted to protect sensitive information. The CNSC acknowledges the cooperation of the participating licensees in making possible the posting of this report.”

⁵⁰ “Security in the Civil Nuclear and Aviation Sectors – Identifying Transferable Best Practices”, Vol.I, World Institute for Nuclear Security (WINS), February 2020.

⁵¹ Ibid., pp.17-18.

⁵² Ibid., p.24.